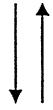
FIG.1

[SEQ. ID NO: 3] X-C-C-T-T-G-A-G-A-T-T-T-C-C-C-T-C

G-G-A-A-C-T-C-T-A-A-A-G-G-G-A-G-X
[SEQ. ID NO: 4]



X-C-C-T-T-G-A-G-A-T-T-T-C-C-C-T-C G-G-A-A-C-T-C-T-A-A-G-G-G-A-G-X

FIG.2

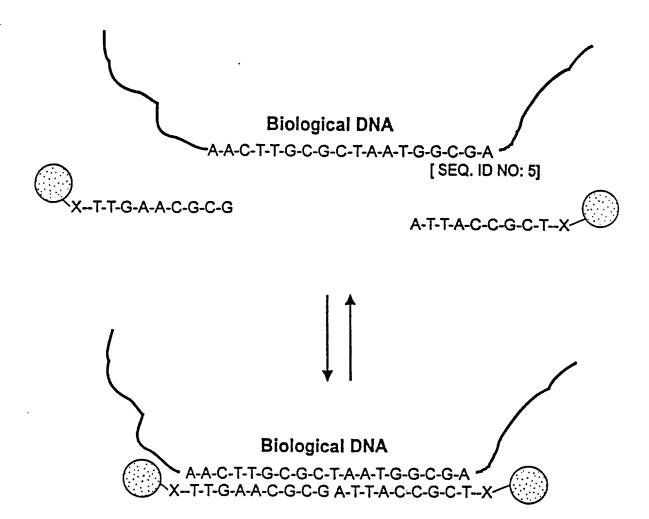
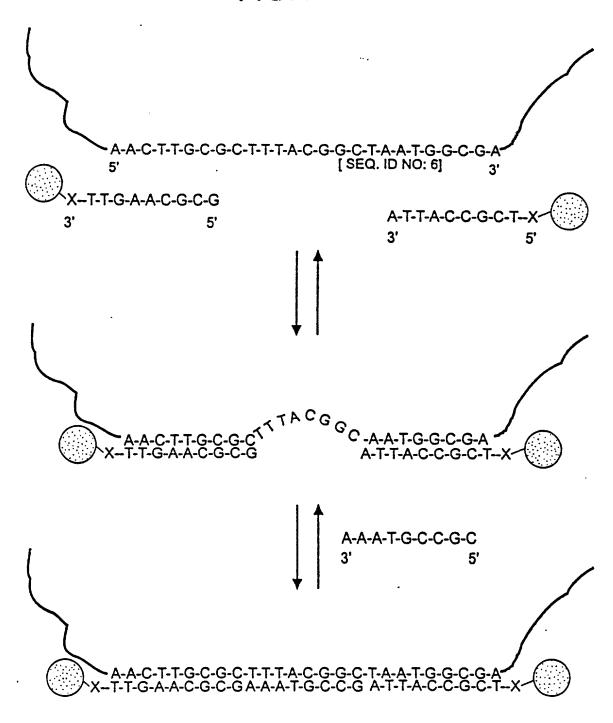
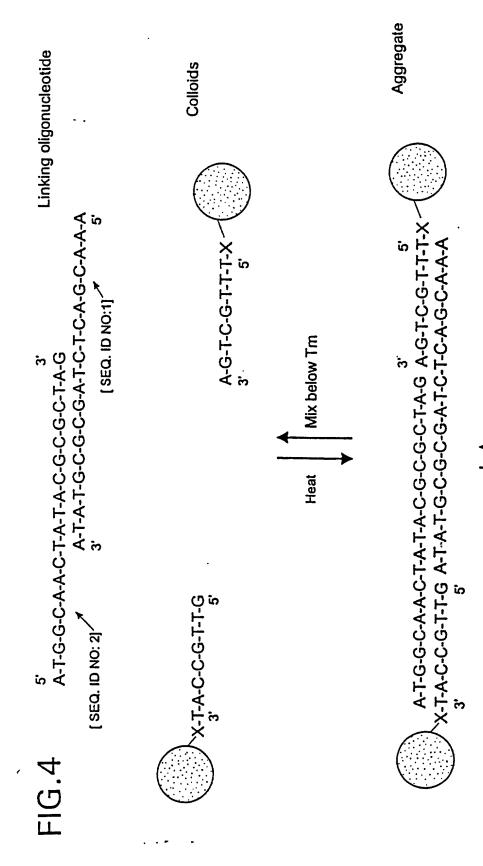


FIG.3





Precipitate (formed by further cross-linking)

Stand below Tm

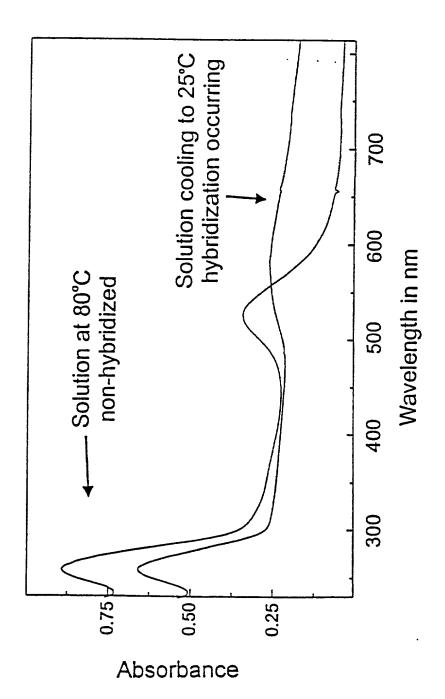
Heat

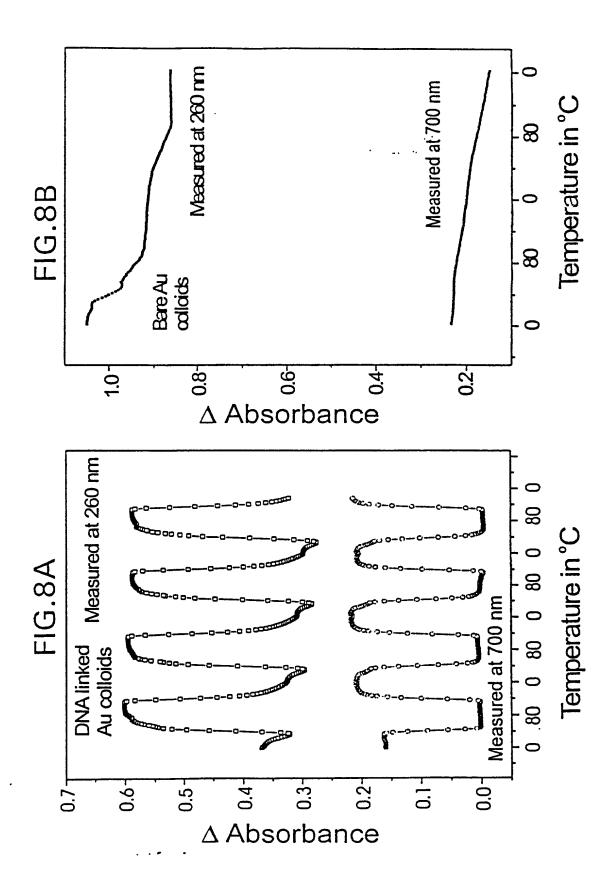
FIG.5 Au nanoparticles Modification with Modification with 3' thiol TACCGTTG 5' 5' AGTCGTTT 3' thiol Addition of linking DNA duplex 5'ATGGCAAC TITT TCAGCAAA 5' Further oligomerization and settling



FIG.6A FIG.6B FIG.6C

FIG. 7





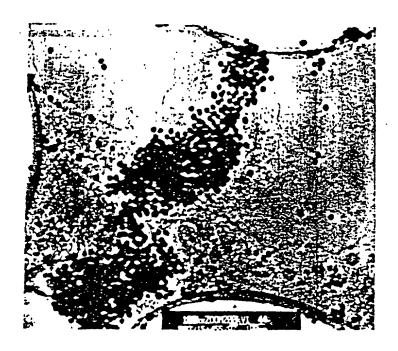


FIG.9A

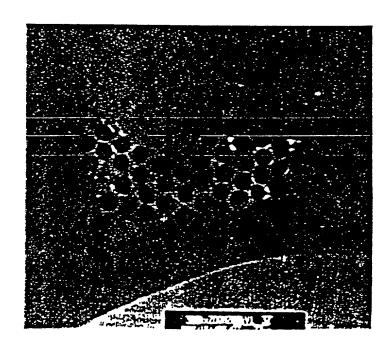
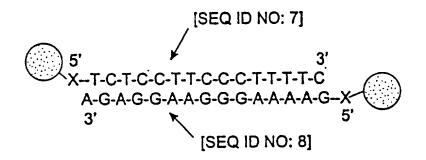
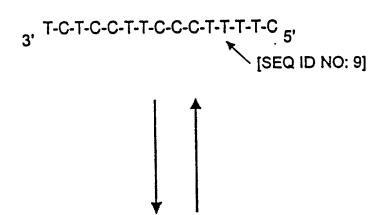


FIG.9B

FIG.10





5' 3' X-T-C-T-C-C-T-T-C-C-C-T-T-T-C A-G-A-G-G-A-A-G-G-X T-C-T-C-C-T-T-C-C-C-T-T-T-C 5'

FIG.11

[SEQ. ID NO: 10]
s-A-T-G-G-C-A-A-C-T-A-C-G-C-G-C-T-A-G-A-G-T-C-G-T-T-T
3'

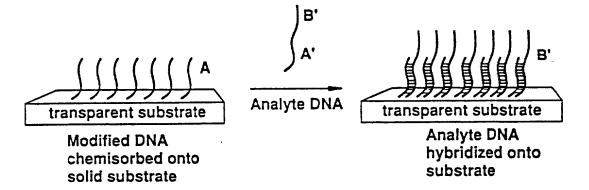
T-A-C-C-G-T-T-G-A-T-A-T-G-C-G-C-G-A-T-C-T-C-A-G-C-A-A--S-() 5' 3' [SEQ. ID NO: 11]

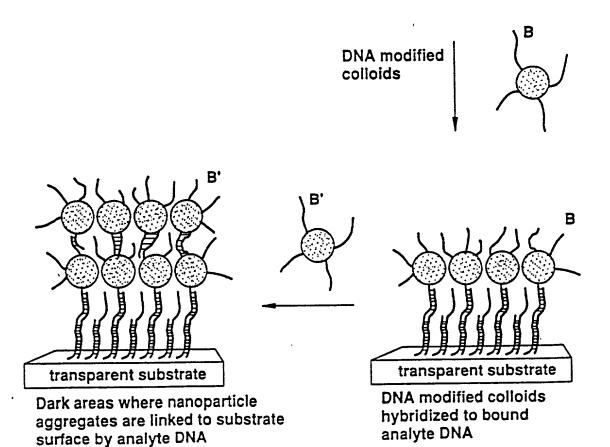


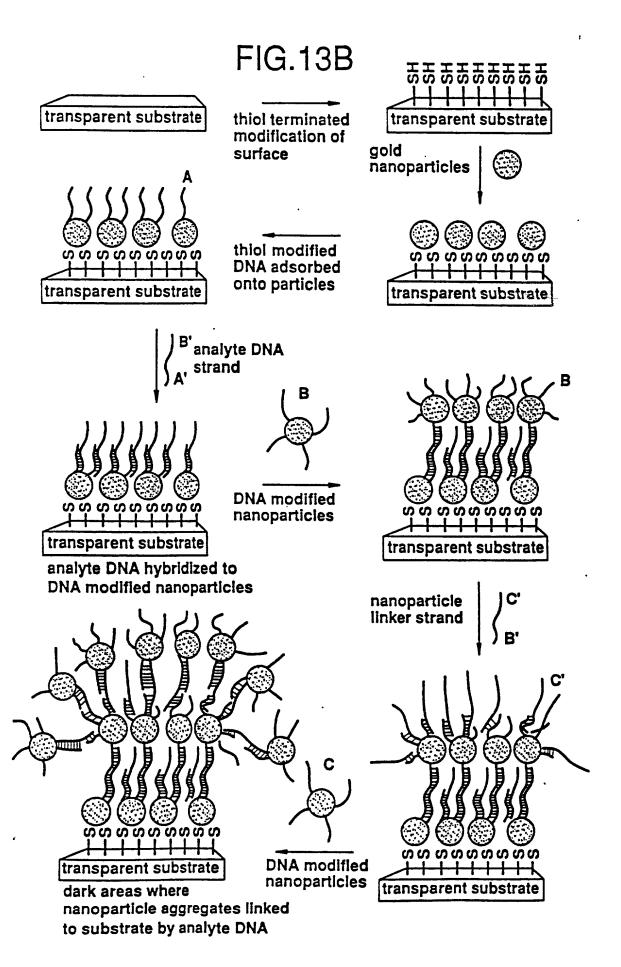
T-A-C-C-G-T-T-G-A-T-A-T-G-C-G-C-G-A-T-C-T-C-A-G-C-A-A--S-A-T-G-C-A-A-C-T-A-T-A-C-G-C-G-C-G-C-T-A-G-A-G-T-C-G-T-T-T

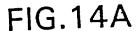
FIG.12A Complementary Target [SEQ. ID NO: 14] SEQ. ID NO:12 3' T-C-G-T-A-C-C-A-G-C-T-A-T-C-C T-T-T-G-C-T-G-A-G-A-T-C-G-C-G 5' A-G-C-A-T-G-G-T-C-G-A-T-A-G-G-A-A-A-C-G-A-C-T-C-T-A-G-C-G-C FIG.12B SEQ. ID NO:13] **Probes without Target** 3' T-C-G-T-A-C-C-A-G-C-T-A-T-C-C T-T-T-G-C-T-G-A-G-A-T-C-G-C-G FIG.12C Half Complementary Target 3' T-C-G-T-A-C-C-A-G-C-T-A-T-C-C T-T-T-G-C-T-G-A-G-A-T-C-G-C-G 5' A-G-C-A-T-G-G-T-C-G-A-T-A-G-G-A-T-G-G-C-A-A-C-T-A-T-A-C-G-C [SEQ. ID NO: 15] FIG.12D Target - 6 bp 3' T-C-G-T-A-C-C-A-G-C-T-A-T-C-C T-T-T-G-C-T-G-A-G-A-T-C-G-C-G 5' G-T-C-G-A-T-A-G-G-A-A-A-C-G-A-C-T-C-T-A-G-C-G-C [SEQ. ID NO:16] **FIG. 12E** One bp Mismatch 3' T-C-G-T-A-C-C-A-G-C-T-A-T-C-C T-T-T-G-C-T-G-A-G-A-T-C-G-C-G 5' A-G-C-A-T-G-G-T-TG-A-T-A-G-G-A-A-A-C-G-A-C-T-C-T-A-G-C-G-C [SEQ. ID NO: 17] FIG. 12F Two bp Mismatch 3' T-C-G-T-A-C-C-A-G-C-T-A-T-C-C T-T-T-G-C-T-G-A-G-A-T-C-G-C-G [SEQ. ID NO: 18]

FIG.13A









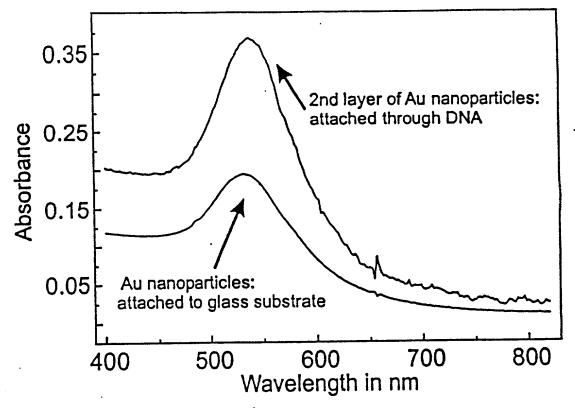


FIG.14B

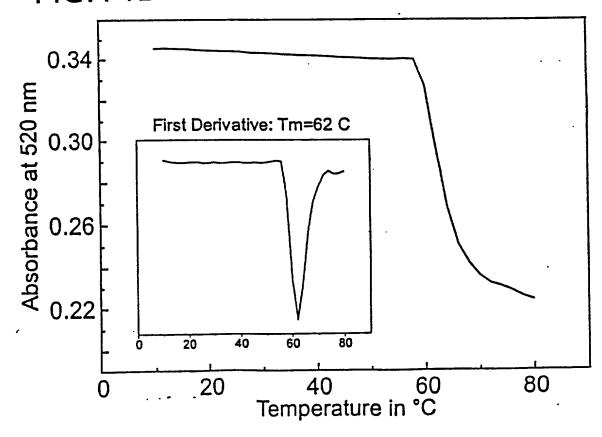


FIG15A	
Probes with No Target SEQ ID NO:19	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S	
1 2	
FIG15B	
Half-Complementary Target 3 SEQ ID NO:21	
5' TAC-GAG-TTG-AGA-GAG-TGC-CCA-CAT 3'	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S	
FIG15C 1 2	
Complementary Target Tm=53.5°C	
SEQ ID NO:22	
5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GCG 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S	
1 2	
FIG15D ONE Base-Pair Mismatch at Probe Head Tm=50.4°C	
5 SEQ ID NO:23	
5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GCT 3'	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 2	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 2 FIG 15E ONE Base-Pair Mismatch at Probe Tail 6 SEQ ID NO:24	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 2 FIG15E ONE Base-Pair Mismatch at Probe Tail	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 2 FIG 15E ONE Base-Pair Mismatch at Probe Tail 6 SEQ ID NO:24 5' TAC-GAG-TTG-AGA-CTC-CTG-AAT-GCG 3'	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S PIG15E ONE Base-Pair Mismatch at Probe Tail SEQ ID NO:24 5' TAC-GAG-TTG-AGA-CTC-CTG-AAT-GCG 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15F Tm=51.6°C	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S PIG15E ONE Base-Pair Mismatch at Probe Tail SEQ ID NO:24 5' TAC-GAG-TTG-AGA-CTC-CTG-AAT-GCG 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 2 EIG15E	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S Tm=46.2°C ONE Base-Pair Mismatch at Probe Tail 5' TAC-GAG-TTG-AGA-CTC-CTG-AAT-GCG 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG 15F ONE Base Deletion 7 SEQ ID NO:25 5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GC 3' SEQ ID NO:25	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15E ONE Base-Pair Mismatch at Probe Tail 5' TAC-GAG-TTG-AGA-CTC-CTG-AAT-GCG 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15F ONE Base Deletion 7 SEQ ID NO:25 5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15E ONE Base-Pair Mismatch at Probe Tail 5' TAC-GAG-TTG-AGA-CTC-CTG-AAT-GCG 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15F ONE Base Deletion 7 SEQ ID NO:25 5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 2 FIG15F ONE Base Deletion 7 SEQ ID NO:25 5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 2	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15E ONE Base-Pair Mismatch at Probe Tail 6 SEQ ID NO:24 5' TAC-GAG-TTG-AGA-CTC-CTG-AAT-GCG 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15F ONE Base Deletion 7 SEQ ID NO:25 5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15G ONE Base-Pair Insertion Tm=50.2°C	
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG 15E ONE Base-Pair Mismatch at Probe Tail 5' TAC-GAG-TTG-AGA-CTC-CTG-AAT-GCG 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 2 FIG 15F ONE Base Deletion 5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG 15G ONE Base-Pair Insertion 8 Tm=50.2°C SEQ ID NO:25	26
S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15E ONE Base-Pair Mismatch at Probe Tail 6 SEQ ID NO:24 5' TAC-GAG-TTG-AGA-CTC-CTG-AAT-GCG 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15F ONE Base Deletion 7 SEQ ID NO:25 5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC 3' S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S 1 FIG15G ONE Base-Pair Insertion Tm=50.2°C	26

FIG. 16A 24 Base Template

5' TAC-GAG-TTG-AGA-ATC-CTG-AAT-GCG 3'

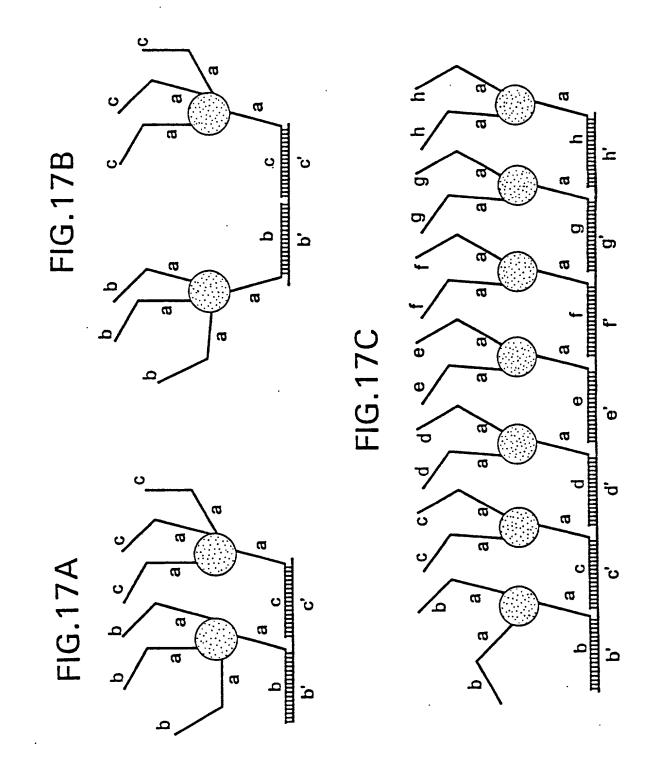
— S-ATG-CTC-AAC-TCT TAG-GAC-TTA-CGC-S —

1

48 Base Template with Complementary 24 Base Filler FIG. 16B

5' TAC-GAG-TTG-AGA-CCG-TTA-AGA-CGA-GGC-AAT-CAT-GCA-ATC-CTG-AAT-GCG 3' >> S-ATG-CTC-AAC-TCT GGC-AAT-TCT-GCT-CCG-TTA-GTA-CGT TAG-GAC-TTA-CGC-S >>

72 Base Template with Complementary 48 Base Filler FIG. 16C



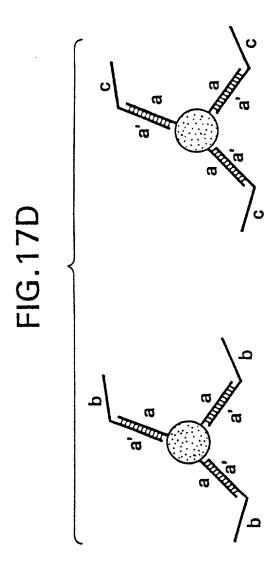
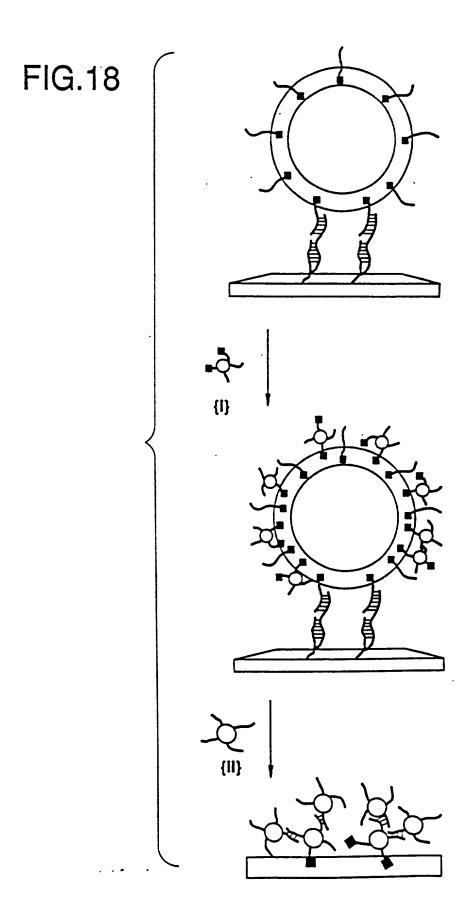
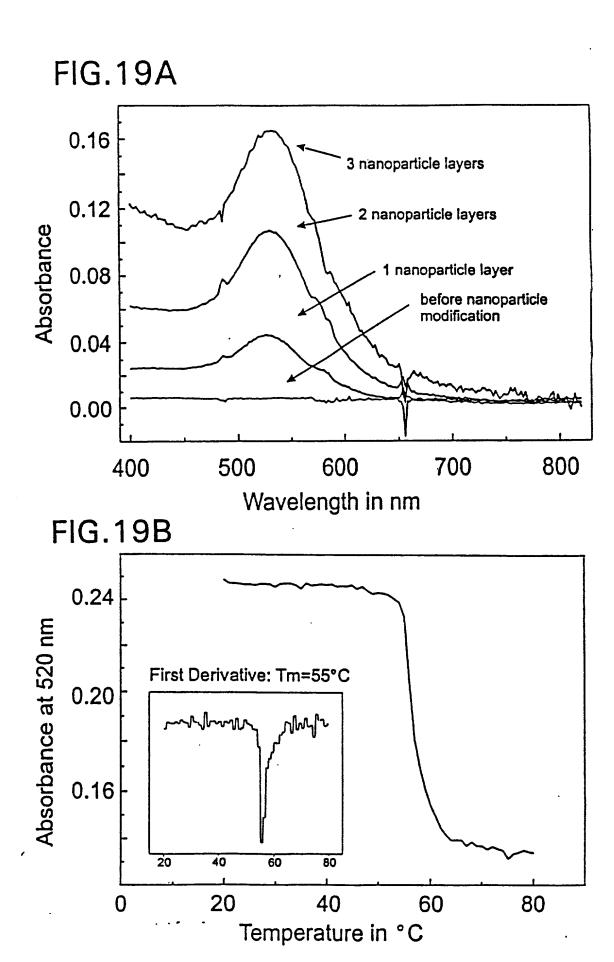
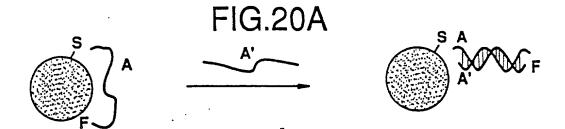
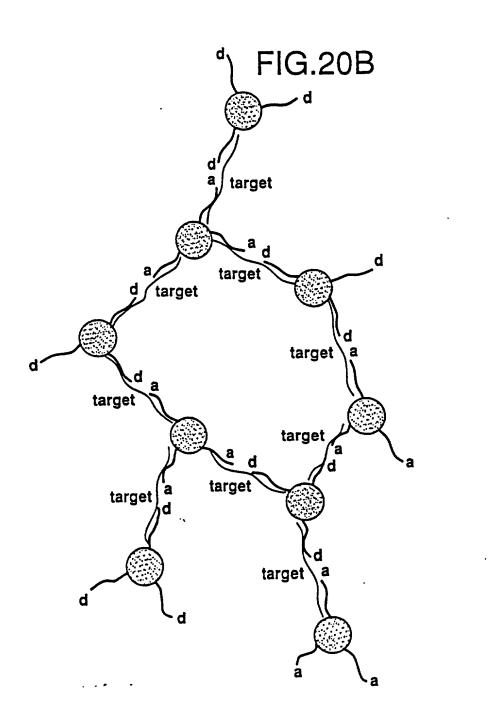


FIG.17E









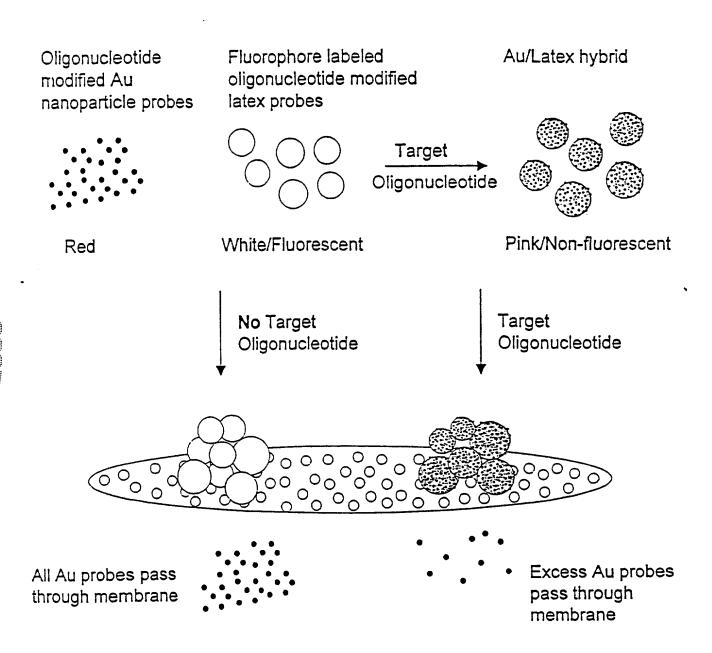
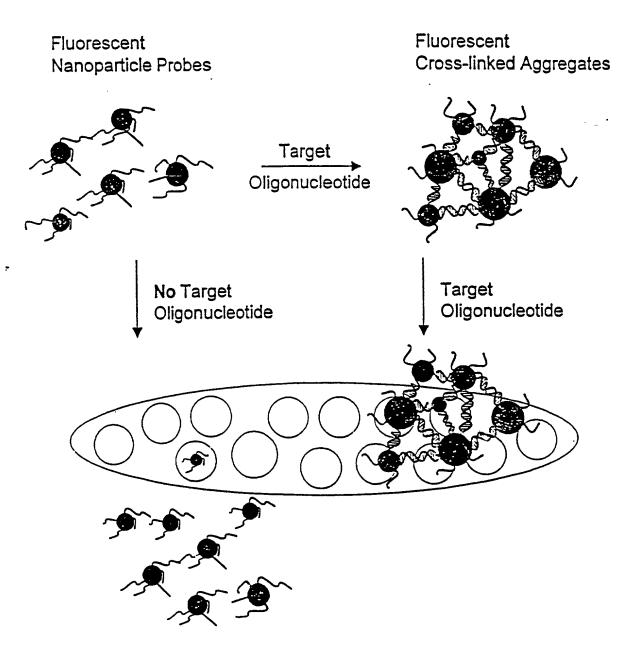


FIGURE 21

FIGURE 22



The fluorescent nanoparticle probes pass through the membrane

The fluorescent cross-linked aggregates are retained by the membrane

Anthrax PCR Product

5'G GCG GAT GAG TCA GTA GTT AAG GAG GCT CAT AGA GAA GTA ATT AAT 3'C CGC CTA CTC AGT CAT CAA TTC CTC CGA ĞŢA TCT CTT CAT TAA TTA

TCG TCA ACA <u>GAG GGA TTA TTG TTA AAT ATT GAT AAG GAT</u> ATA AGA AAA AGC AGT TGT CTC CCT AAT AAC AAT TTA TAA CTA TTC CTA TAT TCT TTT

ATA TTA TCC AGG GTT ATA TTG TAG AAA TTG AAG ATA CTG AAG GGC TT 3' TAT AAT AGG TCC CAA TAT AAC ATC TTT AAC TTC TAT GAC TTC CCG AA 5

141 mer Anthrex PCR product [SEQ ID NO:36]

[SEQ 10 NO: 31] 3' TTA TAA CTA TTC CTA

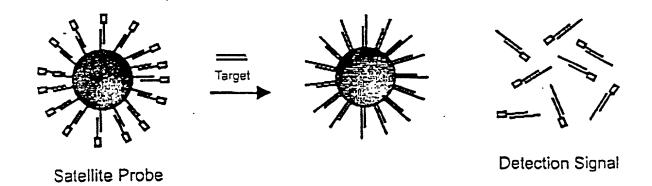
ID NO: 38] [SEQ

Oligonucleotide-Nanoparticle Probes

Blocker Oligonucleotides

NO:397 [SE Q 3' C CGC CTA CTC AGT CAT CAA TTC CTC CGA GT [0 4:04 di [SEQ 3' A TCT CTT CAT TAA TTA AGC AGT TGT NO: 417 3' TAT TCT TTT TAT AAT AGG TCC CAA TAT L 569 17 ND: 42] 3' AAC ATC TIT AAC TIC TAT GAC TTC CCG AA [SE Q

FIGURE



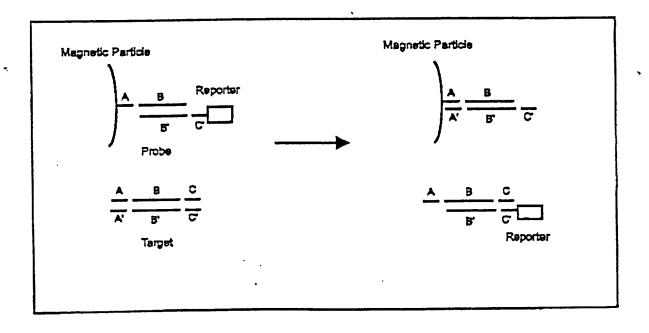


FIGURE 24

1. (target)

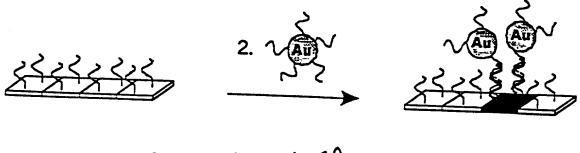


FIGURE 25A

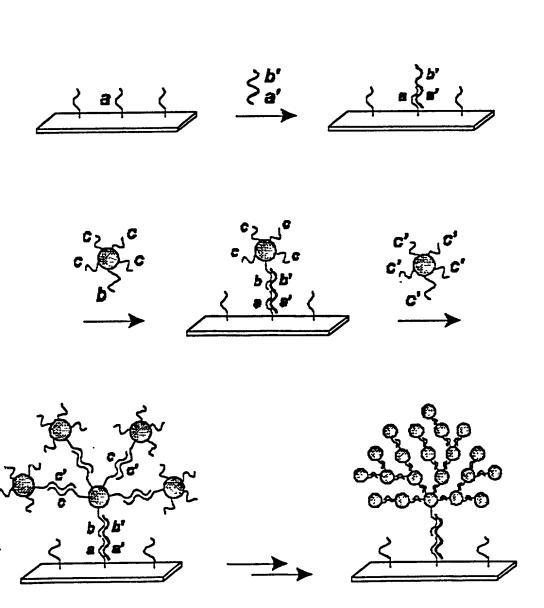


FIGURE 25 B

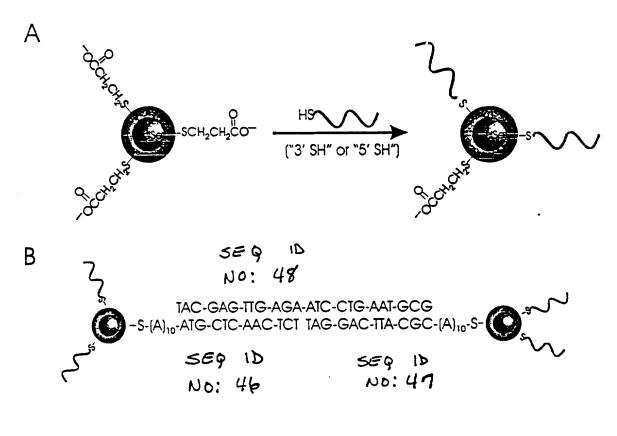
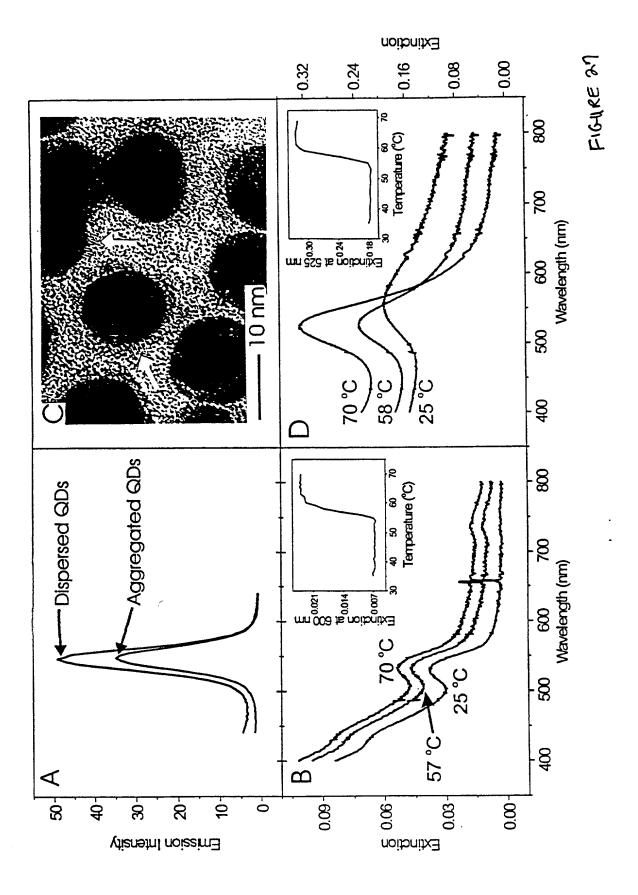


FIGURE 26

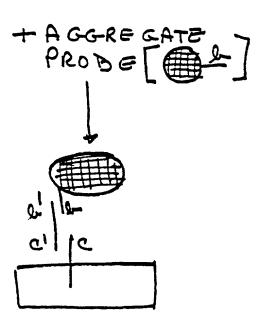


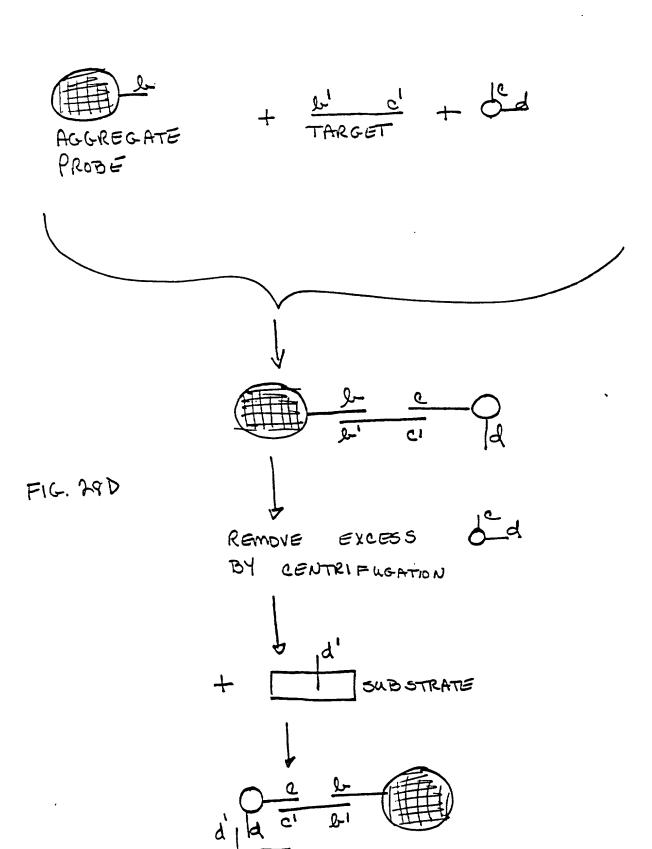
$$\frac{a + \frac{a'}{a'a'}}{a'} \longrightarrow 0$$

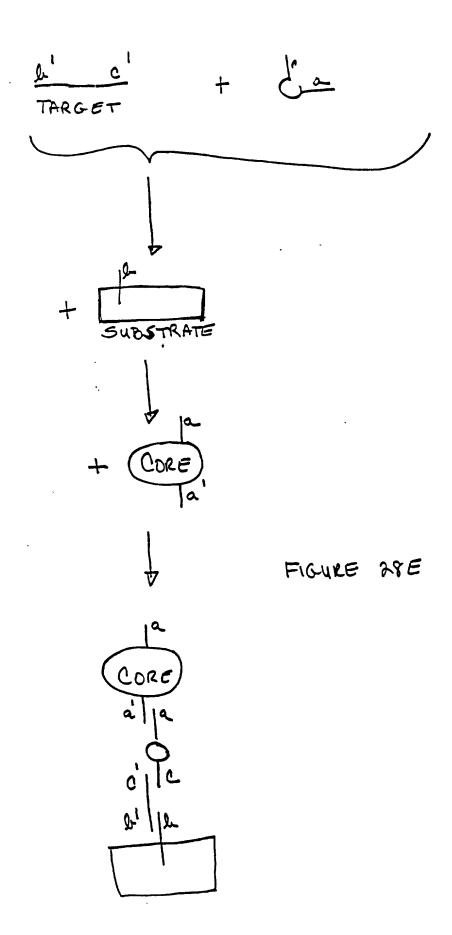
FIGURE 28A

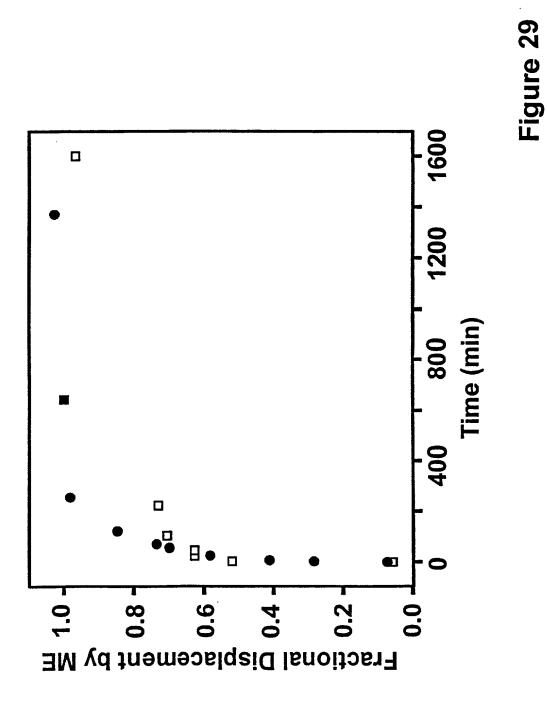
FIGURE AS B

FIG. 28C









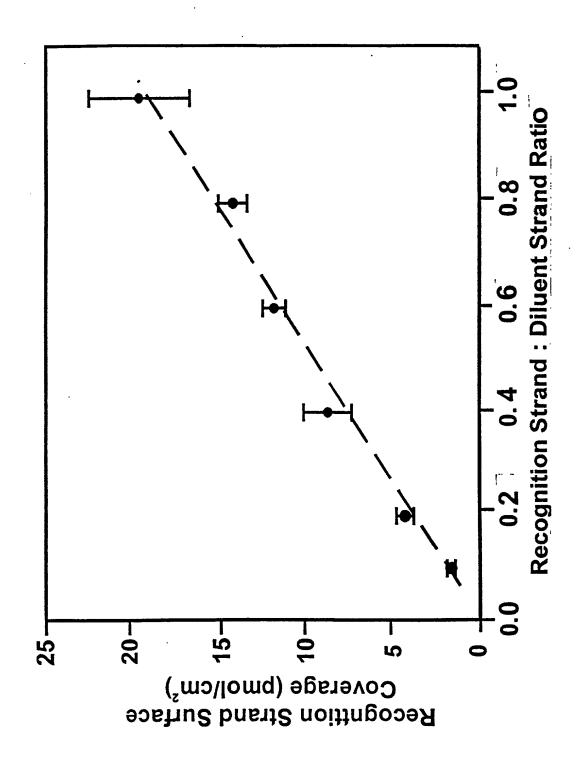
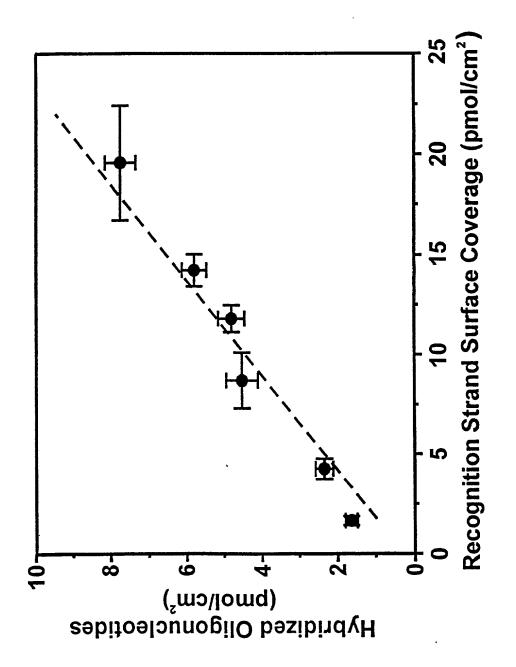


Figure 30



[SEQ ID NO:56] 5' GGA TTA TTG TTA---AAT ATT GAT AAG GAT 3' CCT ANT AAC AAT TTA TAA CTA TTC CTA [SEQ ID NO:57] [SEQ ID NO:58] N = A (complementary), G,C,T (mismatched)

1. **\(\lambda\)** (target DNA)
2. \(\frac{1}{2}\)

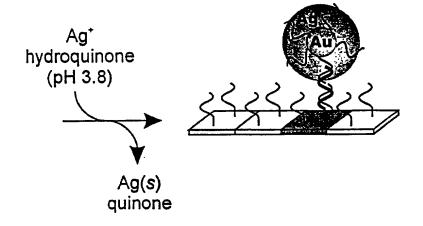


Figure 32

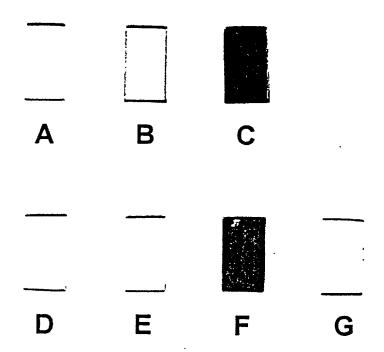


Figure 33

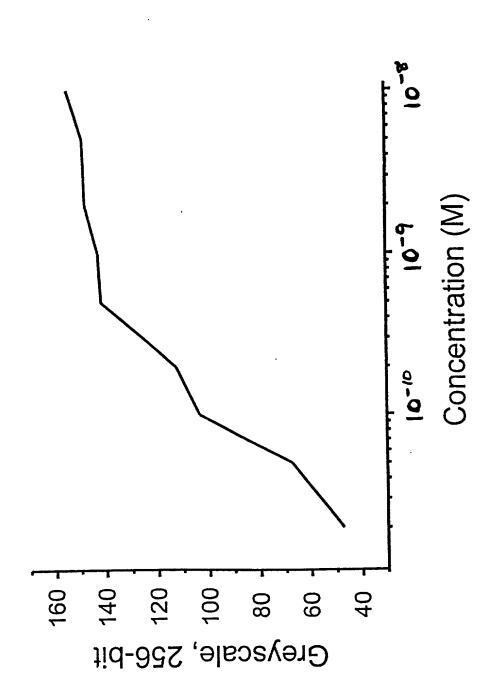


Figure 34

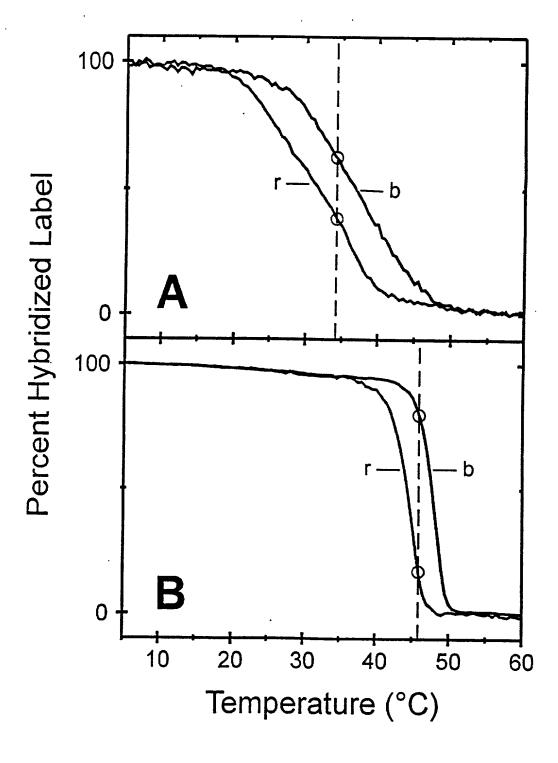
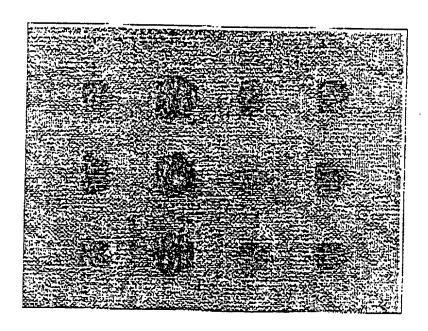
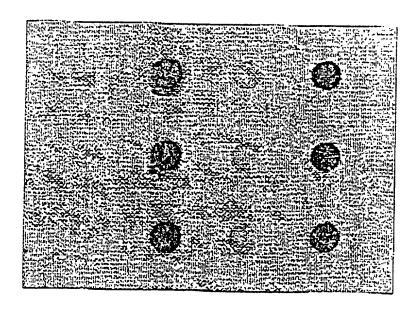


Figure 35

FIG. 364



F16.368



C A T G

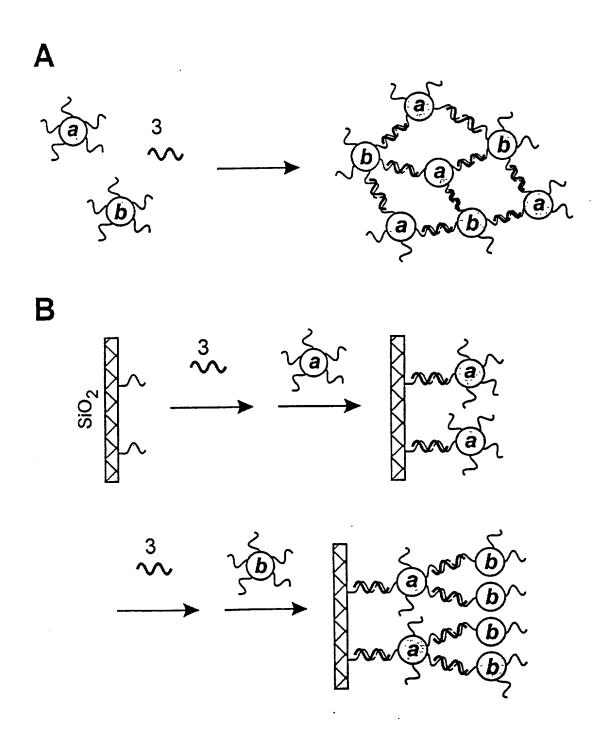


Figure 37

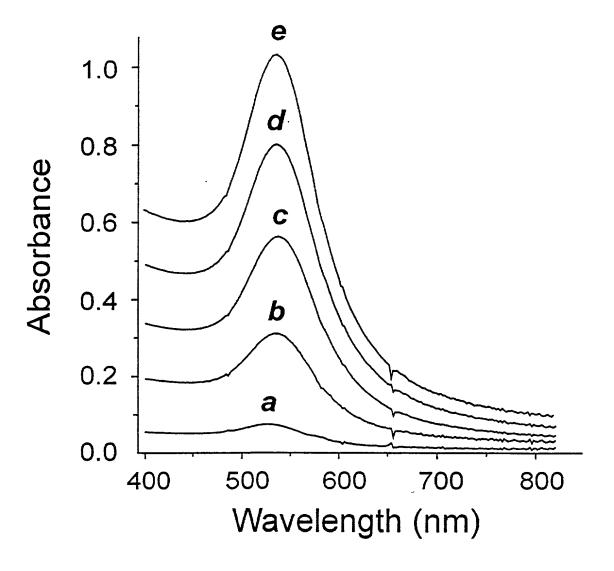


Figure 38A

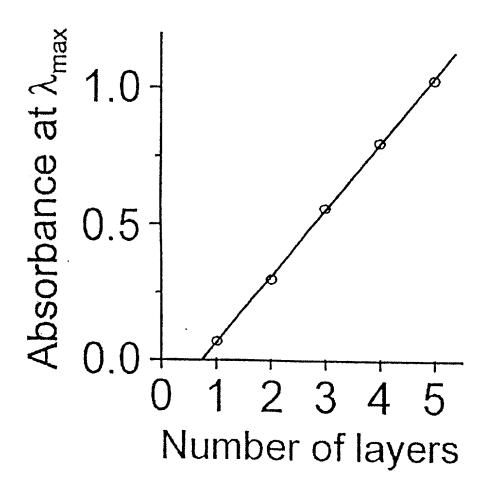


Figure 38B

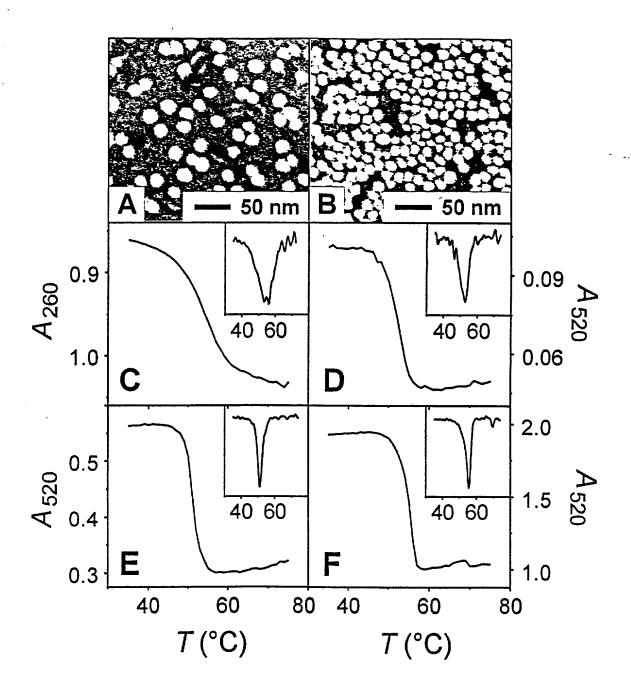
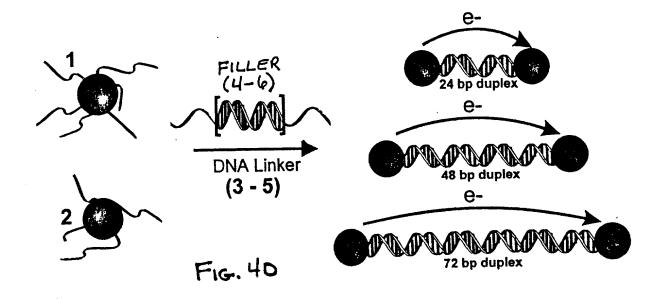


Figure 39



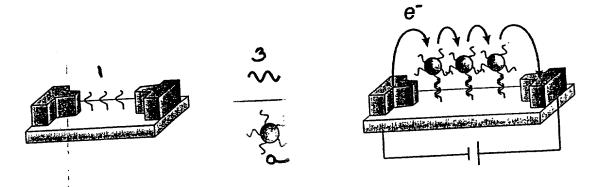


FIG. 41